Global analysis of ocean surface fluxes of heat and freshwater

J. Curry, P. Webster, E. DiLorenzo, Georgia Tech-
C. Clayson, Florida State
N. Romanou, Columbia Univ.

Project hypothesis: careful analysis and blending of global satellite and NWP surface flux products, that are intercompared and evaluated against existing surface observations, can be used to provide useful forcing for ocean models and a meaningful evaluation of coupled climate model simulations.

Deliverable: 20 year blended surface flux product for the global ocean

Technical approach and/or methods:

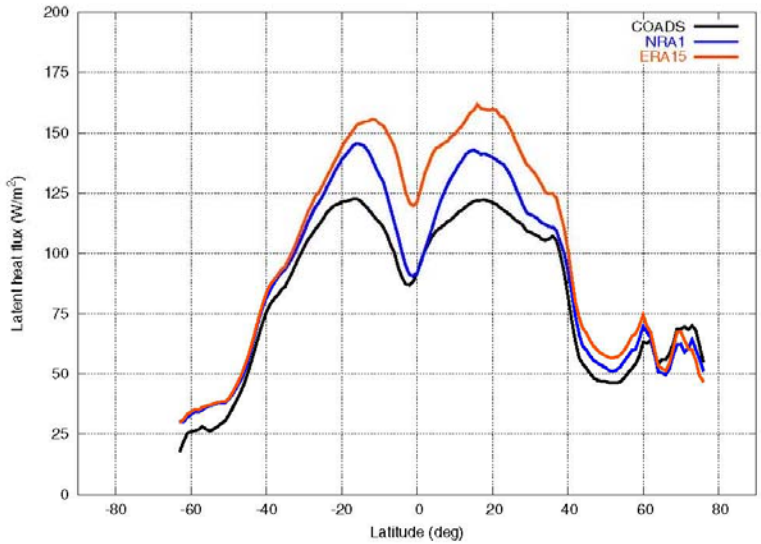
- Evaluate surface fluxes and their input variables for available satellite data sets and NWP reanalyses using SEAFLUX data
- Assemble new “best” blended surface flux product with best values of radiation fluxes and precipitation and the best input variable products for surface turbulent fluxes that are then combined using a new bulk aerodynamic flux model improved for high wind conditions
- Evaluate the blended flux data set in the context of basin net heat and freshwater fluxes and the implied meridional transports.
- Use blended flux data set to force regional ocean models and to evaluate U.S. CMEP model runs.
- Evaluate surface fluxes and their input variables for available satellite data sets and NWP reanalyses using SEAFLUX data

Kubota et al. (2003)

COADS

NRA1

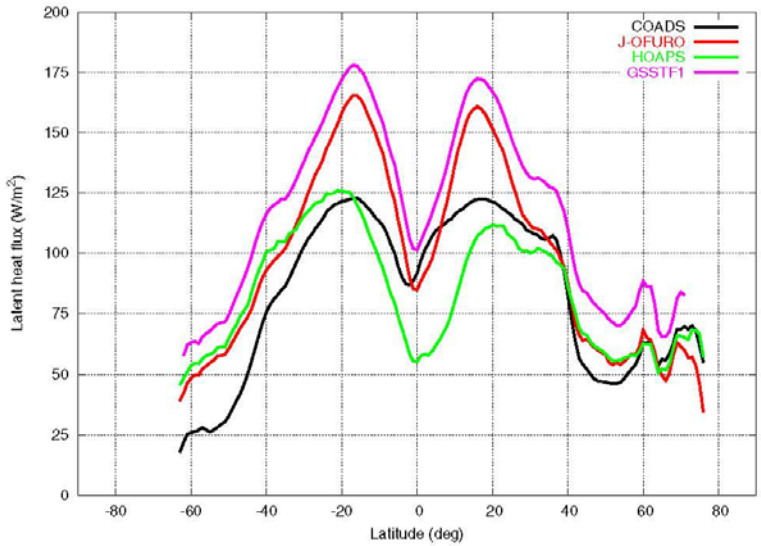
ERA15



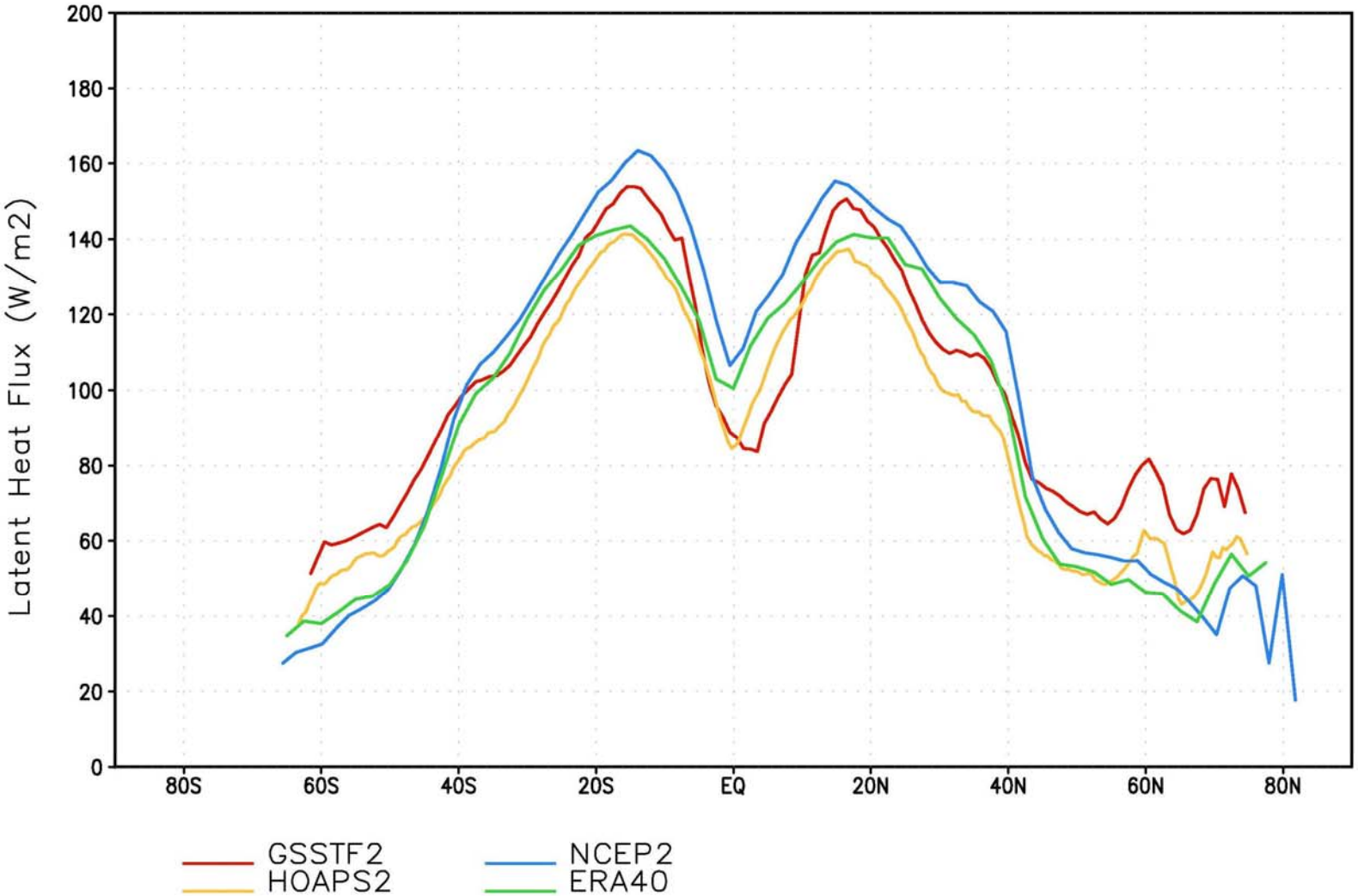
COADS

GSSFT1

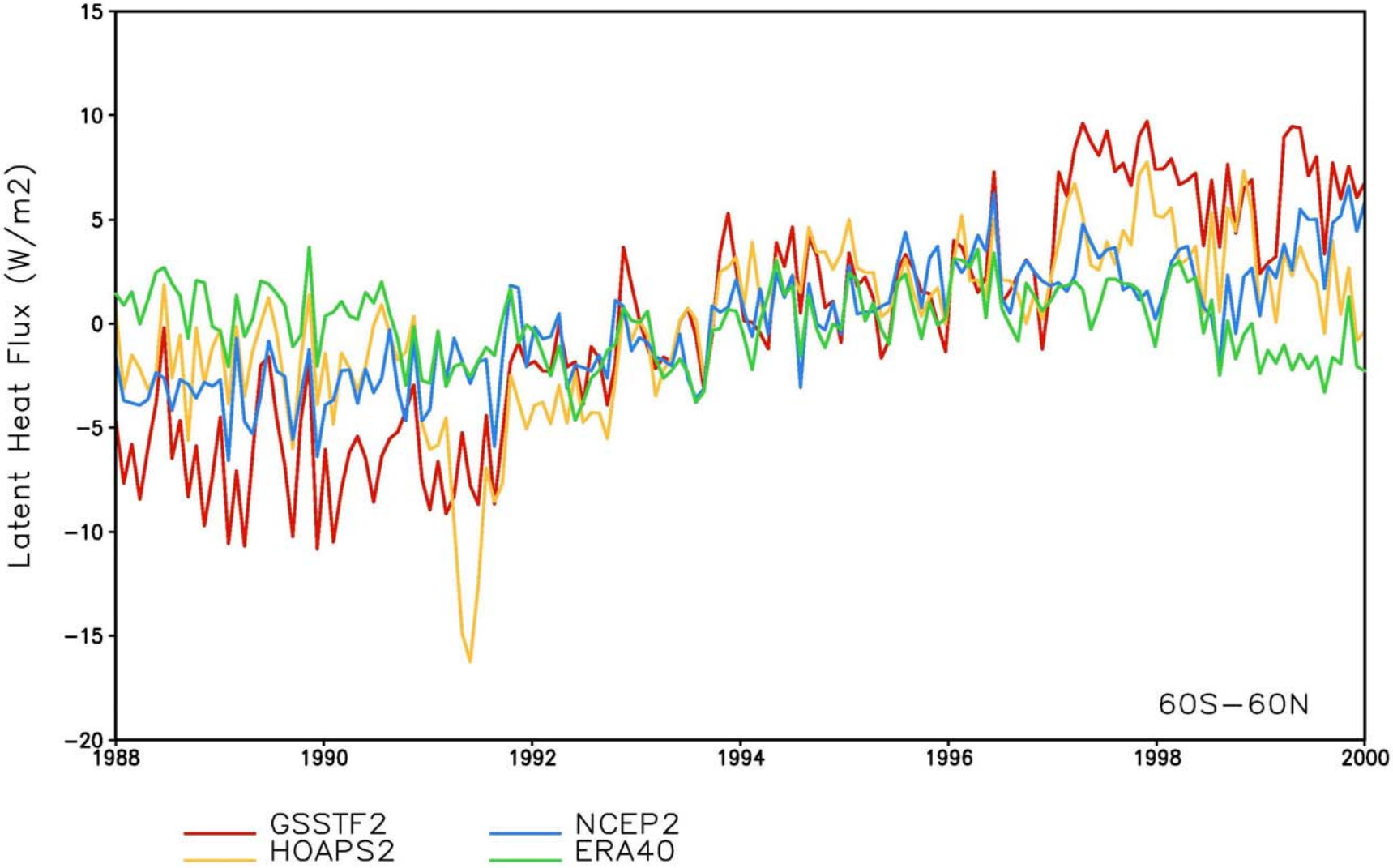
HOAP
S



NASA ENERGY AND WATER CYCLE STUDY
NEWS


Latent Heat Flux (W/m2)
200
180
160
140
120
100
80
60
40
20
0
80S
60S
40S
20S
EQ
20N
40N
60N
80N
GSSTF2
HOAPS2
NCEP2
ERA40

Trends in surface latent heat flux



Data set needs:

- surface radiation fluxes (ISCCP) (3 hourly, 1 degree)
- precipitation (daily, 1degree)
- surface winds (scatterometers, passive microwave)
- SST (skin, 3 hourly)
- surface air T, q

Project outputs:

- 20 year surface latent heat flux product (daily, 1 degree)
- integrated ocean surface flux product (all components)

Potential collaborations :

- Main collaborators: Wentz, Liu
- Need products from: Adler, Fetzer
- My project may help: Roads, Soden, Bosilevich
- Possible indirect connections: Famiglietti, Hornbuckle

Important outside linkages/resources :

- SEAFLUX
- JSC/SCOR Working Group on Surface Fluxes
- NOAA NCDC (Bates et al.)
- GEWEX Radiation Panel Projects

Issues, needs, and concerns:

- consistency of resolution, gridding among the products
- coordination between product, modeling, and application groups to make sure that what we are doing is useful
- “research to operations”
- gap: surface fluxes over sea ice, marginal ice zones